HS SEDI
Homeland Security Systems Engineering and Development Institute

EDXLSharp & IC.NET
Tools & Best Practices for EDXL

Don McGarry
dmcgarry@mitre.org
@dpmcgarry (Twitter)

Homeland Security

My Background

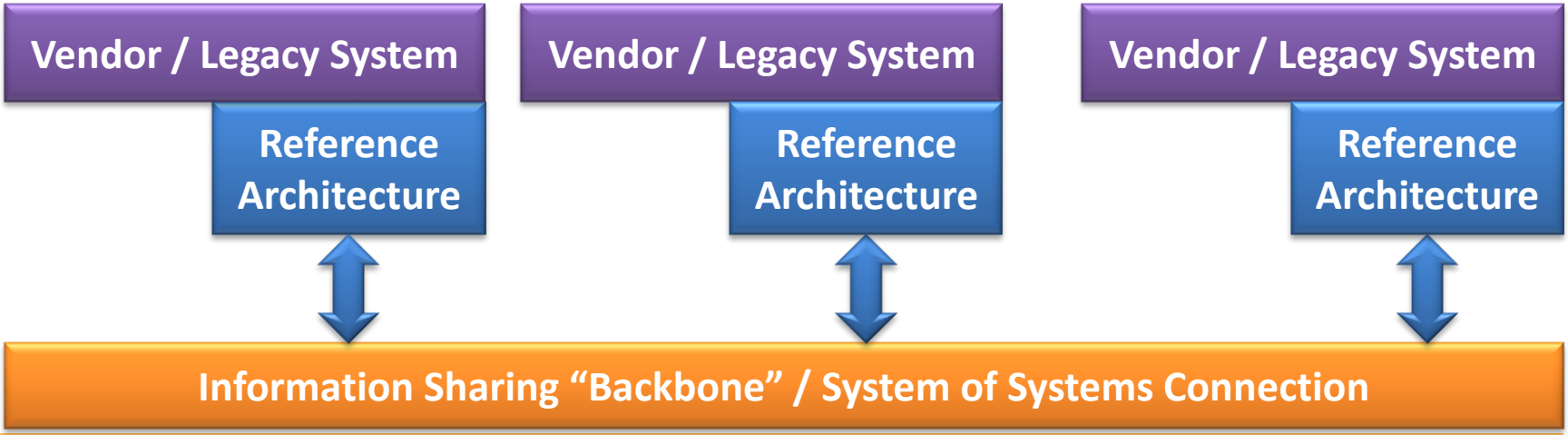
- **Practicing Paramedic in New York State since 2001**
  - 3 years full-time
  - Currently part-time
- **Paramedic Instructor for State University of New York Upstate Medical University**
- **FEMA certified in Incident Command System, National Incident Management System, & National Response Framework**
- **Ph.D. Candidate in Electrical & Computer Engineering – Syracuse University**
  - Proposal Defense completed 3/29/10

Overview

- **IC.NET is a research project originally focused on interoperability of data systems for First Responders**
- **Based on the First Responder use case, we have developed a lightweight / deployable messaging architecture that is broadly applicable in scenarios such as:**
  - Environments with diverse communications architectures
  - Limited connectivity environments
  - Rapid deployment / emerging situations requiring rapid response
  - Deployments requiring a lightweight / portable / adaptable solution
- **This messaging architecture is applicable:**
  - With different systems that require an easy way to share data with one another
  - Where differing end-applications (C2 / Visualization tools) want to share a common view
  - Use cases involving systems with differing IT maturity capabilities

IC.NET Background / Purpose

- Internal R&D project under the MITRE Innovation Program
- Focused on delivering lightweight / deployable messaging
- Guaranteed interoperability at “run time”
- Fully based on open and international data standards:
  - OASIS Emergency Data Exchange Language (EDXL)
- Rapid integration, lower development time, allows for multiple protocols
- Allows for differing user interfaces, customization
- Clearly specified “box” for interoperability portion of a system
- IC.NET is a prototype implementation of the Reference Architecture



Los Angeles Deployment

HS SEDI
Homeland Security Systems Engineering and Development Institute

- **Exposure of LAFD CAD data as a standard product (EDXL)**
  - Active 9-1-1 incidents
  - Unit Status
- **Exposure of Hospital Status / Availability data (EDXL)**
  - Initially converted data from local vendor (Reddinet)
  - Vendor is now producing data in EDXL-HAVE natively
- **Exposure of LAFD Automated Vehicle Location (AvL) data**
  - Initially converted data from local pilot
  - Vendor will producing data in EDXL natively (ADASHI)
- **Connection with ICBRNE effort**
  - Data already produced in EDXL – integration time was 15 min!
- **Federation with LAPD RACR, LA City/County EOC**
- **Used 24x7x365 as adjunct operational capability**
- **Operational deployments to support:**

  OGP 2010, LA Marathon 2011, FEMA USAR MOBEX 2011

NY-NJ-CT-PA RCPT Pilot

- **Working with a number of agencies within the Regional Catastrophic Planning Team's region including:**
  - New York City Office of Emergency Management (NYCOEM)
  - New Jersey Office of Homeland Security & Prevention (NJ OHSP)
  - RCPT projects for the entire region
- **Virtual Regional Operations Center (VROC) effort:**
  - Apply EDXL-SitRep standard to provide a realtime dashboard for Situational Awareness of high level decision makers
  - Map existing Essential Elements of Information identified by NYCOEM leadership to EDXL-SitRep data standards for exchange among multiple systems
  - Developing adapters & prototype code to exchange EDXL-SitRep messages between multiple Incident Management Systems

NY-NJ-CT-PA RCPT Pilot

HS SEDI
Homeland Security Systems Engineering and Development Institute

- **Regional Resource Management Systems (RRMS) Project**
  - Work with RCPT members to be able to exchange Resource Messaging data between multiple IMS systems using EDXL-RM
  - Develop a common resource typing schema that can be re-applied nationally for sharing Resource Data using EDXL-RM – this is not covered in the EDXL-RM standard
  - Develop adapters / prototype code to connect the various IMS together using EDXL standards through tools like IPAWS and ICNET
  - Develop a workflow for effectively sharing EDXL-RM messages in a way that meets the CONOPS of the various RCPT members
- **Investigation Support for NJ OHSP**
  - Federated Search tools for Fusion Center / JTTF Operators
  - Analysis tools for investigators to quickly analyze various social media and public internet sources used for both HUMINT and Criminal Investigation
  - Developing social media analysis tools
  - Developing mobile applications for Law Enforcement Investigators

NY-NJ-CT-PA RCPT Pilot

- **Additional Support to NYCOEM:**
  - Deployment of ICNET within the OEM network
  - Development of an open source CAP authoring tool
  - Support to the NYC CMAS / PLAN test
  - Development of additional visualization tools for EDXL data
- **RCPT members wants to begin to experiment with operational pilots at pre-planned events with off-site command posts**
- **RCPT is also exploring cutting edge capabilities such as:**
  - Mobile Applications for First Responders
  - Ad-hoc / MANET data networks for disaster response
  - Automated Command Center Capabilities provided by C^3IB

Other Pilots in Development

- **NYC Office of Emergency Management (NYC OEM)**
  - Common operating picture needs
  - Standards integration
  - Desire to adopt / pilot EDXL-SitRep
- **NY-NJ-CT-PA Regional Catastrophic Planning Team (RCPT)**
  - Regional resource information federation using EDXL-RM
  - Situational reporting / information sharing
- **Boston EM / Transit Authority**
  - Resource management
  - Common operating picture
  - Data federation using EDXL
- **US Coast Guard**
  - Mobile Applications
  - EDXL / NIEM information sharing
  - Information sharing between FSL
- **US Marine Corps**
  - 911 Center Modernization
  - Information sharing between DoD – Civilian
- **US Air Force**
  - Situational Awareness tools
  - Information sharing between DoD - Civilian
- **Clemson University**
  - Discussions about information sharing / Augmented Reality
- **UPitt**
  - Decision support tools / information federation

What Distinguishes IC.NET

HS SEDI
Homeland Security Systems Engineering and Development Institute

- **Focus on operational systems interoperability**
- **Moving from "Situational Awareness" to "Command & Control"**
- **Application of the EDXL-DE routing concepts for local integration and federation of systems based on user-defined roles and policy**
  - Data "owners" control data
  - Management model similar to "home" router
  - Scalable & flexible using enterprise messaging industry practices
- **Flexible security model from open to full PKI**
- **Entirely standards based (EDXL / NIEM)**
- **Make the standards easy for initial use and rapid integration**
- **Open architecture, open source, easy to transition**
- **Focused on the Standards & Architecture, not the system**
- **Primary goal is industry adoption, not system adoption**

IC.NET Data Types

HS SEDI
Homeland Security Systems Engineering and Development Institute

- **Person / Evacuee Tracking**
- **Resource Management**
  - Available Resources
  - Resource Requests
  - Resource Tasking / Status
- **CBRNE Sensor Data**
- **Hospital Status / Availability**
- **Emergency Patient Tracking**
- **Debris Management**
- **Alerts & Warnings**
- **Situation Reporting**
  - Summary / Rollup Reports
  - Field / "Spot" Reports
- **Blue Force Tracking**
- **Unit Status / PLI**
- **Active "Incidents"**

Exiting External Standards

- **NIEM IEPDs**

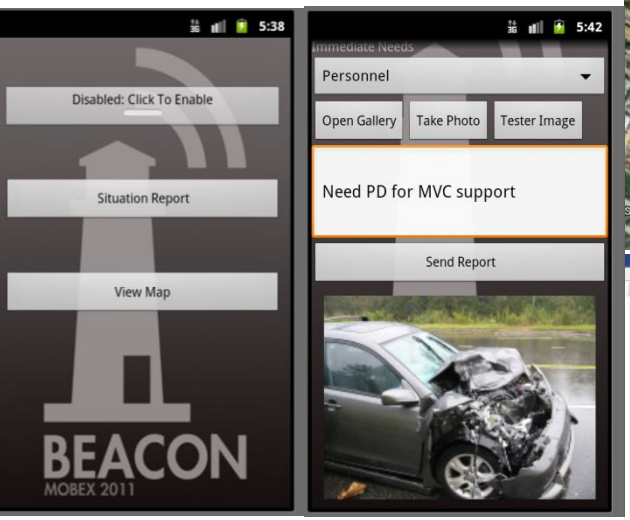
Standard Exchange

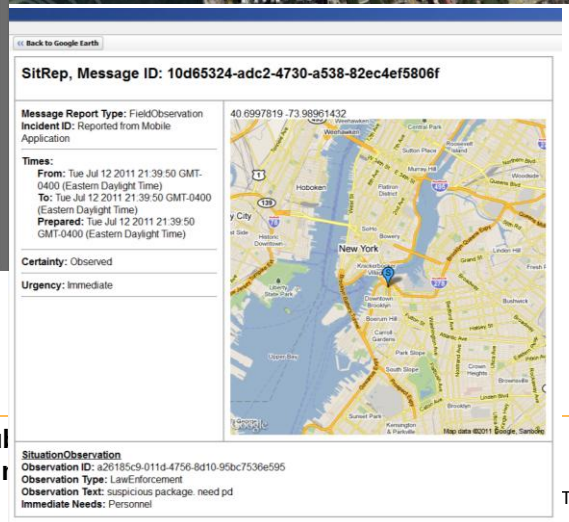
- **Plain Old XML (POX)**
- **Binary Data (Images, Office, etc.)**

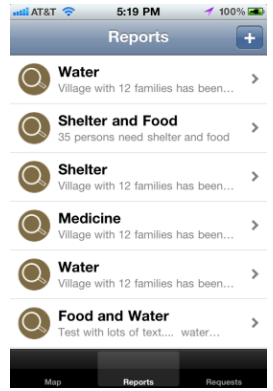
Custom Payload

Research in Mobility

- Leverage personal “smart” devices (Android, Tablet, iPhone, iPad) for disaster response
- Integrate EDXL & NIEM into the mobile space







C³IB – Command Cloud in a Box

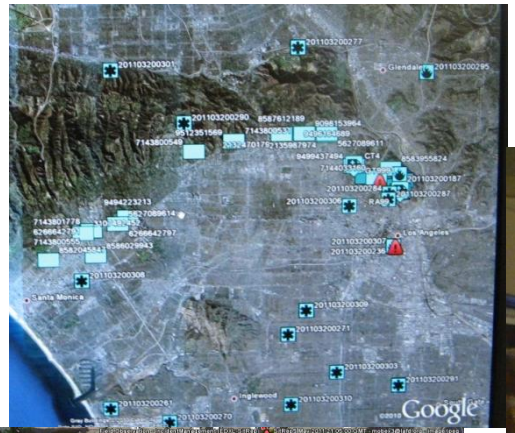
HS SEDI
Homeland Security Systems Engineering and Development Institute

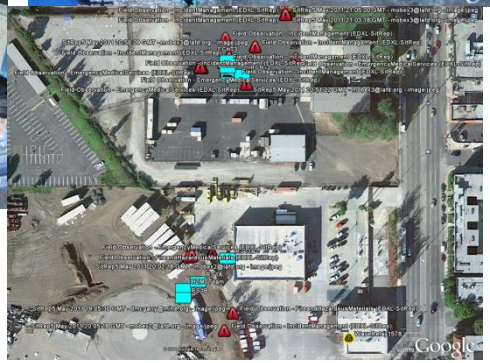
- **C³IB is expansion of the IC.NET research effort to include the broader context of deploying cutting-edge IT capabilities to a disaster site without the need for IT support**
- **Goal:** Fully autonomous & self-aware system using cloud computing, mobile, 'smart' networking, and self-aware technologies that can be deployed in an emergency to support disaster response CONOPS.
- **Key Research Areas:**
  - Focus on cloud computing
  - Focus on mobility
  - FEMA / Disaster Response Emphasis
  - Use of existing open standards (EDXL)
  - Definition of enterprise 'best practices' for dynamic federation of enterprise systems
- **Impact:**
  - 10x improvement in efficiency for disaster response

Technology Transition

- **Free & Open Source (FOSS) libraries for EDXL**
  - Includes:
    - CAP 1.2, EDXL-DE, EDXL-HAVE, EDXL-RM 1.0, GeoOASIS Where, CIQ
    - IPAWS Forwarder / Poller
    - CAP Construction tool
    - GUI EDXL-DE Test Tool
    - Beta implementations of HAVE, DE 2.0 & SitRep, TEP 1.0
  - Over 1600 downloads in 8 months
  - Libraries being used by industry, vendors, govt.
  - Code homepage: http://edxlsharp.codeplex.com
- **MITRE IC.NET Public Prototype available: http://icnet.mitre.org & http://icnet-test.mitre.org**
- **Prototype available as an Amazon Machine Image (AMI) on the public cloud and a downloadable Virtualization Image (OVF)**
- **EDXL Public Documentation http://en.wikipedia.org/wiki/EDXL**
- **Academic Presentations**

Demonstration





HS SEDI
Homeland Security Systems Engineering and Development Institute

Homeland Security

Approved for Public Release.
Distribution Unlimited. Case #11-3146, 11-1107

HS SEDI
Homeland Security Systems Engineering and Development Institute

Questions?